Translation

PCT/FR2003/002878

PATENT COOPERATION TREA

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference R8200WO	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/FR2003/002878	International filing date (*day/month/year*) 01 octobre 2003 (01.10.2003)	Priority date (*day/month/year*) 01 octobre 2002 (01.10.2002)
International Patent Classification (IPC) or national classification and IPC H04L 1/00		
Applicant TDF.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 11 mars 2004 (11.03.2004)	Date of completion of this report 16 February 2005 (16.02.2005)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/FR2003/002878

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-4, 6-19, as originally filed

pages _____, filed with the demand

pages 5, filed with the letter of 28 September 2004 (28.09.2004)

☐ the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages 1-17, filed with the letter of 21 October 2004 (21.10.2004)

☒ the drawings:

pages 1/4-4/4, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/FR 03/02878

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	9-11	YES
	Claims	1-8, 12-17	NO
Inventive step (IS)	Claims	11	YES
	Claims	1-10, 12-17	NO
Industrial applicability (IA)	Claims	1-17	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents:

D1: PAPKE L ET AL: 'Different iterative decoding algorithms for combined concatenated coding and multiresolution modulation' COMMUNICATIONS, 1994. ICC '94, SUPERCOMM/ICC '94, CONFERENCE RECORD, 'SERVING HUMANITY THROUGH COMMUNICATIONS.' IEEE INTERNATIONAL CONFERENCE ON NEW ORLEANS, LA, USA 1-5 MAY 1994, NEW YORK, NY, USA, IEEE, 1 May 1994 (1994-05-01), pages 1249-1254, ISBN: 0-7803-1825-0

D2: KHAIRY M M ET AL: 'ASYMMETRIC MODULATION AND MULTISTAGE CODING FOR MULTICASTING WITH MULTI-LEVEL RECEPTION OVER FADING CHANNELS' MILCOM 1999. IEEE MILITARY COMMUNICATIONS CONFERENCE PROCEEDINGS. ATLANTIC CITY, NJ, OCT. 31 - NOV. 3, 1999, IEEE MILITARY COMMUNICATIONS CONFERENCE, NEW YORK, NY: IEEE, US, vol. VOL 1 OF 2 CONF. 18, 31 October 1999 (1999-10-31), pages 92-96, ISBN: 0-7803-5539-3

D3: KUEHN V: 'EVALUATING THE PERFORMANCE OF TURBO CODES AND TURBO-CODED MODULATION IN A DS-CDMA ENVIRONMENT' IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, IEEE INC., NEW YORK, US, vol. 17, no. 12, December 1999 (1999-12), pages 2138-2147, ISSN: 0733-8716

1. The present application fails to comply with the requirements of PCT Article 33 since the subject matter of claims 1 to 8 and 12 to 17 does not meet the requirement of novelty defined in PCT Article 33(2).

1.1 **Claim 1**

Document D1 describes a method for receiving a signal modulated according to a multilevel encoding technique including at least two encoding levels each having a separate noise robustness (page 1250, right-hand column, lines 1-10; figures 2 and 3), wherein said signal includes a plurality of symbols that each include at least one bit assigned to one of said encoding levels (page 1250, right-hand column, lines 11-17; figures 2 and 3).

Said method includes at least one decoding iteration including a series of decoding steps involving decoding each of said received bits, wherein at least one of said decoding steps takes into account the result of at least one possible previous decoding step (page 1252, left-hand column, lines 5-14; figures 4 and 5).

Said bits are decoded in a predetermined order taking into account the robustness of said levels, where the one or more bits assigned to the coding level having the highest noise robustness, referred to as the most robust level (page 1250, right-hand column, lines 8-10; SDTV bits), are decoded first (page 1252, left-hand column, lines 5-14; SDTV bits), and said method includes a series of at least two decoding iterations (page 1252, left-hand column, lines 5-14; SDTV bits).

1.2 **Claim 14**

Document D1 describes a method for decoding a signal modulated according to a multilevel encoding technique including at least two encoding levels each having a separate noise robustness (page 1250, right-hand column, lines 1-10; figures 2 and 3), wherein said signal includes a plurality of symbols that each include at least one bit assigned to one of said encoding levels (page 1250, right-hand column, lines 11-17; figures 2 and 3).
Said method includes at least one decoding iteration including a series of decoding steps involving decoding each of said received bits, wherein at least one of said decoding steps takes into account the result of at least one possible previous decoding step (page 1252, left-hand column, lines 5-14; figures 4 and 5).
Said bits are decoded in a predetermined order taking into account the robustness of said levels, where the one or more bits assigned to the coding level having the highest noise robustness, referred to as the most robust level (page 1250, right-hand column, lines 8-10; SDTV bits), are decoded first (page 1252, left-hand column, lines 5-14; SDTV bits), and said method includes a series of at least two decoding iterations (page 1251, left-hand column, lines 54-57).

1.3 **Claim 15**

Document D1 describes a device for receiving a signal modulated according to a multilevel encoding technique including at least two encoding levels each having a separate noise robustness (page 1250, right-hand column, lines 1-10; figures 2 and 3), wherein said signal includes a plurality of symbols that each include at least one bit assigned to one

of said encoding levels (page 1250, right-hand column, lines 11-17; figures 2 and 3).
Said device includes decoding means performing decoding of each of said received bits one after the other, wherein decoding of at least one of said received bits takes into account the result of at least one possible previous decoding step (page 1252, left-hand column, lines 5-14; figures 4 and 5).
Said decoding means decode said bits in a predetermined order taking into account the robustness of said levels, where the one or more bits assigned to the coding level having the highest noise robustness, referred to as the most robust level (page 1250, right-hand column, lines 8-10; SDTV bits), are decoded first (page 1252, left-hand column, lines 5-14; SDTV bits), and said decoding means perform a series of at least two decoding iterations (page 1251, left-hand column, lines 54-57).

1.4 **Claim 16**

Document D1 describes a system for coding and decoding a signal including a plurality of symbols that each include at least one bit, including at least one encoding device for modulating said signal according to a multilevel encoding technique including at least two encoding levels each having a separate noise robustness, wherein each of said bits is assigned to one of the encoding levels (page 1250, right-hand column, lines 1-17; figures 2 and 3), and at least one decoding device including decoding means performing decoding of each of said received bits one after the other, and decoding of at least one of said received bits takes into

account the result of at least one possible previous decoding step (page 1252, left-hand column, lines 5-14; figures 4 and 5).

Said decoding means decode said bits in a predetermined order taking into account the robustness of said levels, where the one or more bits assigned to the coding level having the highest noise robustness, referred to as the most robust level (page 1250, right-hand column, lines 8-10; SDTV bits), are decoded first (page 1252, left-hand column, lines 5-14; SDTV bits), and said decoding means perform a series of at least two decoding iterations (page 1251, left-hand column, lines 54-57).

1.5 **Claim 17**

Document D1 describes the use (page 1250, right-hand column, lines 1-17; page 1252, left-hand column, lines 5-14; figures 2 to 5) in at least one of the following fields:

- and digital radio transmissions, particularly DRM ("Digital Radio Mondiale");
- area correcting codes;
- digital signal processing;
- digital communication;
- recording and reproduction of digital signals,

of a method for receiving a signal modulated according to a multilevel encoding technique including at least two encoding levels each having a separate noise robustness (page 1250, right-hand column, lines 1-10; figures 2 and 3), wherein said signal includes a plurality of symbols that each include at least one bit assigned to one of said encoding levels (page 1250, right-hand column, lines 11-17; figures 2 and 3).

Said method includes at least one decoding iteration including a series of decoding steps involving decoding each of said received bits, wherein at least one of said decoding steps takes into account the result of at least one possible previous decoding step (page 1252, left-hand column, lines 5-14; figures 4 and 5).
Said reception method is such that are decoded in a predetermined order taking into account the robustness of said levels, where the one or more bits assigned to the coding level having the highest noise robustness, referred to as the most robust level (page 1250, right-hand column, lines 8-10; SDTV bits), are decoded first (page 1252, left-hand column, lines 5-14; SDTV bits), and said method includes a series of at least two decoding iterations (page 1252, left-hand column, lines 5-14; SDTV bits).

1.6 Dependent claims 2 to 8, 12 and 13 do not appear to contain any additional feature which, when combined with the subject matter of any one of the claims on which they are dependent, might define subject matter that complies with the EPC requirements of novelty.

Document D1 describes the additional features in dependent claims 2 and 4 (page 1250, right-hand column, lines 8-10; page 1252, left-hand column, lines 5-14; SDTV bits), 3 (page 1251, left-hand column, lines 54-57; page 1252, left-hand column, lines 5-14; figures 4 and 5), 5 (page 1251, left-hand column, lines 24-30; figure 4), 6 and 8 (page 1252, left-hand column, lines 5-14; figures 4 and 5), 7 (page 1251, left-hand column, lines 54-57) and

13 (figure 4).

Document D2, which discloses the features in claim 1 (page 94, right-hand column, line 20 to page 95, left-hand column, line 19; figure 3), also discloses the additional features in dependent claim 12 (page 95, right-hand column, lines 7-34; figure 3).

2. Claims 9 and 10 fail to comply with the requirements of inventive step of the PCT.

Document D1, which is considered to be the closest prior art, describes a reception method from which the one forming the subject matter of claims 9 and 10 differs in that the extrinsic information is in the form **α(Sr-Se)**, where Sr is the received symbol, Se is the estimated transmitted signal, and α = 0.25.

The problem that the present invention is intended to solve can thus be considered to be that of overcoming the inefficient use of extrinsic information in successive iterations.

The solution proposed in claims 9 and 10 of the present application is not considered to be inventive (PCT Article 33(3)), for the following reasons:

These features have already been used for the same purpose in an equivalent method (see D3, page 2143, right-hand column, lines 1-31). It is obvious for a person skilled in the art to implement these features, with a corresponding effect, in a method according to document D1, and thus arrive at a

method according to claims 9 and 10. It follows that the subject matter of claims 9 and 10 does not involve an inventive step (PCT Article 33(3)).

3. The features in claim 11 are not found in or obvious from the prior art.